TABLE 4-4
TECHNOLOGY SCREENING TABLE – SOIL GAS
IDENTIFICATION OF CANDIDATE TECHNOLOGIES
RIVERSIDE INDUSTRIAL PARK SUPERFUND SITE
NEW JERSEY

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS (Effectiveness, Implementability, Relative Cost)	RETAINED
No Action	Not Applicable	Not Applicable	Under this response action, no active response action will be taken to address concerns regarding soil gas. The no action alternative is required to be considered by the NCP to provide a baseline against which all other alternatives may be compared.	Effectiveness: The no action alternative would not meet ARARs or reduce unacceptable risks to human health or the environment. Implementability: Because no action would be taken, this option can be implemented. Relative cost: No capital, administrative, or O&M cost.	Yes
Institutional Controls	Use Restrictions	Deed Notice	File a Deed Notice (or similarly captioned covenant) whereby the owner agrees to subject the property to certain statutory and regulatory requirements that impose restrictions upon the use of the property, to restrict certain uses of the property, and to provide notice to subsequent owners, lessees and operators of the restrictions and the monitoring, maintenance, and biennial certification requirements are outlined in the Deed Notice.	Effectiveness: Institutional controls would not reduce the toxicity, mobility, or volume of contaminants and would not reduce COPC concentrations to protective levels. These controls alone would not be protective of human health because soil contamination exists at concentrations greater than the PRGs. The Site is zoned as commercial, and a deed notice may be implemented to keep this designation in the future. The effectiveness of institutional controls depends on the reliability of their execution, which is most likely controlled by the local government Implementability: Deed notices have been established for some lots that bind the property owners to certain land use restrictions, notice requirements, and the obligation to inspect and maintain any engineering controls that prevent direct contact with historic fill/soil. Enhancement of existing deed notices may be feasible to allow elevated levels of contaminated soil to remain permanently on-site. Relative cost: Periodic reporting required. Generally low-cost alternative.	Yes
		Classification Exception Area	Submit to the NJDEP an application with the necessary information to establish a classification exception area, that gives notice of the fact that groundwater in the area does not meet designated use requirements.	Effectiveness: CEAs would not reduce the toxicity, mobility, or volume of contaminants and would not reduce COPC concentrations to protective levels. These controls alone would not be protective of human health because contamination exists at concentrations greater than PRGs. CEAs have been established for some lots to prevent groundwater use for purposes other than monitoring. CEAs will remain in place as long as groundwater does not meet designated use standards. Implementability: CEAs have been established for some lots that bind the property owners to groundwater use restrictions and notice requirements. Designation of additional CEAs may be feasible. Relative cost: Groundwater monitoring and periodic reporting will be required as a component of the CEA. Generally low-cost alternative.	Yes
	Monitoring	Indoor Air Sampling	Conduct indoor air sampling in existing occupied buildings	Effectiveness: Air monitoring will be effective in protecting human health from potential exposure to vapor intrusion by monitoring air quality and triggering corrective action to prevent an unacceptable exposure. Implementability: Equipment is readily available, requires property owner cooperation and access. Relative cost: Periodic air monitoring and reporting. Generally low-cost alternative	

TABLE 4-4
TECHNOLOGY SCREENING TABLE – SOIL GAS
IDENTIFICATION OF CANDIDATE TECHNOLOGIES
RIVERSIDE INDUSTRIAL PARK SUPERFUND SITE
NEW JERSEY

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS (Effectiveness, Implementability, Relative Cost)	RETAINED
Engineering Controls	Subsurface Barriers	Vapor Barrier	A passive barrier consisting of a synthetic membrane installed prior to foundation construction to reduce soil vapor migration.	Effectiveness: Vapor barriers would not reduce the toxicity, mobility, or volume of contaminants but could reduce COPC concentrations to protective levels in indoor air. Vapor barriers can be used with passive or active subsurface depressurization process options to help prevent indoor vapor intrusion. Vapor barriers are considered a supplement to extraction mitigation measures and may be sprayed on to existing building interiors or placed below foundations for new construction. Implementability: Vapor barriers are an easily implemented option for new construction with a variety of materials to choose from. Relative cost: No anticipated long-term maintenance. Generally low-cost alternative.	Yes

TABLE 4-4
TECHNOLOGY SCREENING TABLE – SOIL GAS
IDENTIFICATION OF CANDIDATE TECHNOLOGIES
RIVERSIDE INDUSTRIAL PARK SUPERFUND SITE
NEW JERSEY

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS (Effectiveness, Implementability, Relative Cost)	RETAINED
Removal	Subsurface Depressurization	Active Subsurface Depressurization System (Soil Vapor Extraction)	A negative pressure field (vacuum) is applied to the subsurface though a well network beneath and/or around a building to prevent VI into the building. Active subsurface depressurization systems use a fan or blower to create a negative pressure field (vacuum) below a slab or other barrier.	Effectiveness: Active depressurization would not reduce COPC toxicity or volume but would reduce mobility in the vadose zone. Preferred over a passive system, especially for existing buildings, due to higher success rate for VI mitigation. Implementability: Subsurface depressurization is readily implemented with conventional plumbing and electrical trades. Additional treatment of contaminants after collection may be required. The treatment system may require permitting. Relative cost: Requires continuous power source and maintenance of mechanical components. Periodic monitoring to confirm venting. Generally moderate-cost alternative.	Yes
	Subsurface Depressurization	Passive Subsurface Depressurization System	Natural temperature and barometric pressure fluctuations (e.g., wind) are relied on to induce pressure gradients in a vent stack to remove soil vapors from beneath and/or around a building.	Effectiveness: Depressurization would not reduce COPC toxicity or volume but would reduce mobility in the vadose zone. Vent pipe can be routed through a building to help heat the air from the subsurface for convective flow. Pressure gradient between the sub-slab and the atmosphere may induce advective flow during weather events. Wind over the vent reduces pressure for advective flow. Installation of a solar-powered wind turbine on the stack may be used to help induce a pressure gradient. Not as reliable as an active system. Not recommended without highly permeable sub-slab conditions, or where the seasonal high-water table is less than 5 feet below the building slab. Not retained for detailed analysis. Implementability: Subsurface depressurization is readily implemented with conventional plumbing and electrical trades. Additional treatment of contaminants after collection may be required. Relative cost: Periodic monitoring to confirm venting. Generally low-cost alternative.	No
		Sub-Slab Ventilation System	A venting layer is placed below the slab (new construction) to allow for unimpeded movement of soil gas vapors laterally beyond the footprint of a building or to vent pipes placed in the venting layer. Perforated pipe is placed in the venting layer or at the perimeter of the venting material to assist with collecting and exhausting vapors.	Effectiveness: Would not reduce COPC toxicity, mobility, or volume but could reduce COPC concentrations to protective levels in indoor air. May be used in combination with a passive barrier. Not applicable for existing buildings. Would add marginal benefit to a passive barrier. Not retained for further analysis. Implementability: A venting layer would be easily implemented option for new construction with conventional earthmoving materials and equipment. Relative cost: Periodic monitoring to confirm venting. Generally moderate-cost alternative.	No

TABLE 4-4
TECHNOLOGY SCREENING TABLE – SOIL GAS
IDENTIFICATION OF CANDIDATE TECHNOLOGIES
RIVERSIDE INDUSTRIAL PARK SUPERFUND SITE
NEW JERSEY

GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS (Effectiveness, Implementability, Relative Cost)	RETAINED
Treatment	Ex-Situ Treatment (Physical)	Immobilization/Adsorption	Soil gas is treated with vapor-phase granular activated carbon (GAC), polymers, or zeolites to adsorb and remove volatile compounds.	Effectiveness: Would not reduce COPC toxicity or volume but would reduce mobility. GAC is effective for treating a wide range of volatile compounds and is less expensive than zeolites or polymers. Zeolites are better suited for treating volatile compounds with high polarity (e.g., alcohols and organic acids) or high vapor pressures (e.g., vinyl chloride, methyl tert-butyl ether, and methylene chloride). Implementability: A vapor-phase treatment system would be readily implemented with conventional plumbing and electrical trades and potentially proprietary treatment media. Relative cost: Requires replacement of spent adsorbent. Ongoing operation maintenance activities. Generally low-cost alternative.	Yes
		Photocatalytic Oxidation	Ultraviolet light is used with a semiconductor (e.g., titanium oxide) to generate protons and highly reactive hydroxyl radicals for oxidation of volatile compounds.	Effectiveness: Would reduce toxicity, mobility and volume of soil vapor. Effective for treating a wide range of halogenated and non-halogenated compounds, aromatic and aliphatic hydrocarbons, alcohols, ethers, ketones and aldehydes. Works best at flow rates of less than 100 standard cubic feet per minute. Not widely used for soil vapor treatment. Implementability: Would be implemented with moderate difficulty with specialized knowledge of treatment capabilities. May require bench scale/pilot studies during design. Relative cost: Ongoing operation maintenance activities. Would require a continuous ultraviolet light source. Generally moderate-cost alternative.	Yes
	Ex-Situ Treatment (Thermal)	Thermal Oxidation	Direct flame, flameless, or catalytic oxidizers are used to destroy non-halogenated volatile organic compounds, semivolatile organic compounds, and hydrocarbons at a wide range of concentrations.	Effectiveness: Capable of reducing toxicity, mobility and volume of specific classes of compounds including alcohols, aliphatics, aromatics, esters, and ketones that are generally not Site COPC. If halogenated compounds are present (i.e., chlorinated compounds), acid gases may be generated requiring additional treatment. Most cost-effective for treating concentrations of vapor contaminants greater than 500 parts per million by volume. Safeguards required if concentrations approach lower explosive limit. May produce dioxins and furans if improperly operated. Implementability: Would be implemented with moderate difficulty with specialized knowledge of treatment capabilities. May require bench scale/pilot studies during design. Relative cost: Requires supplemental energy at low concentrations. Ongoing operation maintenance activities. Generally a high-cost alternative. Would offer no additional benefit to less expensive treatment technologies.	No
	Ex-Situ Treatment (Biological)	Biofiltration	Live cultures are used to consume or metabolize chemicals in the off-gas.	Effectiveness: Would reduce toxicity, mobility, and volume of certain Site COPC. Best used for treating dilute (less than 1,500 parts per million by volume) concentrations of mono-aromatic hydrocarbons, alcohols, aldehydes and ketones. Sensitive to variations in operating parameters, such as moisture content, temperature, pH, and influent concentrations. Implementability: Fluctuating groundwater levels contributing to variations in moisture and concentrations of organic compounds would be problematic for this process option. Would require maintenance of substrate for biological culture. Relative cost: Ongoing operation maintenance activities. Generally moderate-cost alternative.	No